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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YEE, DEBORAH

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/790,931	Applicant(s) TAKAYAMA ET AL.	
	Examiner Deborah Yee	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-15,17,20 and 22-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17,22 and 24-29 is/are allowed.
- 6) ☒ Claim(s) 1,3-15,20 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/8/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
2. The newly submitted amendment “diametric pitch P, wherein P is a value obtained by the number of the teeth divided by the pitch diameter of said gear, which satisfies the following relationship: $DI \leq 0.12 \times 1 / 2.54P + 0.2$ ”, raises a new matter issue since no clear descriptive support is shown in the specification for this limitation. Note there is only support for $DI \leq 0.12 \times M + 0.2$, wherein M = the length of the pitch circle / the number of teeth (mm) on pages 27- 28 of instant specification.
3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 9 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claim 9 recites a “case-hardened gear... made from a steel material containing at least 0.05 to 0.20 wt% in total of one or more alloy elements selected from the group consisting of Ti, Zr, Nb, Ta and Hf, and one or more compounds selected from the group consisting of the carbides, **nitrides** and **carbonitrides** of said alloy elements”,

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which is indefinite because there is no nitrogen contained in the composition of the steel material to produce nitrides or carbonitrides.

6. Claim 20 recites "the method of producing a case-hardened gear ...comprises a preheating treatment step in which the steel material is preheated at 300°C to the A1 temperature before the induction hardening treatment step" which appears to be redundant or unnecessary since parent claim 17 already recites "a Cr concentration treatment step for heating the steel material at 300°C to the A1 temperature" prior to induction hardening.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1, 3, 5, 7 to 15 and 23 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 to

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13 of copending Application No. 10/984,833. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both disclose a case-hardened gear satisfying the limitations wherein $DI \leq 0.12 \times M + 0.2$ and compressive residual stress is 50 kgf/mm² or more, and is made from analogous steel material composition (analogousness established by same alloying constituents with overlap in wt% ranges), and contains 0.05 to 0.2 wt% one or more carbide, nitride and carbonitrided having an average diameter of 0.1 to 5 μ m. In addition, the claims of copending Application No. 10/984,833 recite 0.3 to 0.8% solid-dissolved carbon and finely granulated cementite phase of 5 vol. % with an average particle diameter of 0.1 to 1.5 μ m and average Cr concentration in cementite phase at up to 3.5 vol. % that overlap with the ranges of the same limitations recited by pending claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

9. Applicant's arguments filed April 8, 2009, with respect to the rejection(s) of claim(s) 1, 3-8, 10-15, 17-20 and 22-24 under 35 U.S.C. 103(a) as being unpatentable over US Patent 3,663,314 ("Monma") alone or in view of US Patent 2002/0029597 ("Choe") or English abstract of Japanese patent 408081738 ("JP-738") have been fully considered and are persuasive. As stated by Applicant, Monma is directed to bearing steel which is heating at 810 to 870°C for 30 minutes in a furnace followed by quenching. If prior art heat treatment is applied to the gear, at least a tooth section would be entirely heated and quenched and hardened. In contrast, inventive claims

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recite a case hardened gear having a rolling contact surface layer hardened by induction heating from a temperature equal to or lower than the A1 temperature to a quenching temperature of 900 to 1100°C within 10 seconds and subsequently cooled and tempered at 100 to 300°C whereby 2 to 18 vol.% cementite containing an average Cr concentration of 2.5 to 10 wt%, and 0.25 to 0.8 wt% solid-dissolved carbon are dispersed in martensitic parent phase of the case-hardened layer. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of European patent 1,273,672.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3 to 15 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over European patent 0950723 ("EP-723) in view of the English abstracts of Japanese patent 406025736 (JP-736) or Japanese patent 360162726 (JP-726), which was previously applied in office action dated March 1, 2007.

11. EP-723 in claims 1 to 11 on page 13 discloses a case-hardened gear which is made from a steel material comprising a composition with constituents whose wt% overlap those recited by the claims; and such overlap in alloy wt% ranges establishes a prima facie case of obviousness since it would be obvious for one skilled in the art to

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select the claimed alloy wt% ranges over the broader disclosure of the prior art because the same utility is taught, see MPEP 2144.05.

12. EP-723 in claims 1 and 5 discloses a gear wherein rolling contact surface layer is case-hardened and exhibits a parent phase of martensite dispersed with carbides mainly composed of cementite in an amount of up to 30 vol. % and having an average grain size of 3 μm which overlap and suggest the recited cementite at 2 to 18 vol. % with an average grain size range of 0.1 to 1.5 μm in claims 1 and 3.

13. Even though a Cr concentration of 2.5 to 10 wt% in the cementite $((\text{Fe}, \text{Cr})_3\text{C})$ as recited by claim 1 is not taught by prior art, such would be expected since prior art in paragraphs [0043] and [0047] teaches the Cr concentration heat treating step of reheating A1 to less than 900°C after hardening and cooling to a temperature lower than A1.

14. Even though martensite parent phase containing 0.25 to 0.8 wt% solid-dissolved carbon as recited by claim 1 is not taught by prior art, such would be expected since prior art steel is hardened at a high temperature range of 930 to 1,100°C, same as Applicant's hardening temperature of 900 to 1100°C, to enable carbon to dissolve in matrix.

15. EP-723 in paragraph [0043] discloses rolling contact surface can contain pearlite and would suggest claim 4; and in paragraph [0025] discloses a residual retained austenite at 20 to 80 vol. % with a preferred range of 20 to 60 vol. % and is within the range of 10 to 60 vol. % recited by claim 5.

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16. EP-723 does not teach prior austenite grain having an ASTM grain size No. 10 as recited by claim 6 but prior austenite grain size is an intermediate property to make a final product which would not be a patentable distinction.

17. EP-723 in claims 1 to 11 discloses alloying constituents with wt% ranges that would overlap and therefore suggest the compositional limitations recited by dependent claims. Also prior art paragraph [0040] teaches adding up to 0.1 wt% of Nb, Ti and Zr to form fine nitrides and/or carbonitrides having a particle size of 1 μm dispersed in hardened martensitic surface layer, which meets claim 9.

18. EP-723 in paragraphs [0001] and [0063] and figure 12 disclose producing a case-hardened gear subjected to shot peening to generate a compressive residual stress of 50 Kgf/mm^2 or more to improve fatigue strength which meets one or more of the recited claims. Even though the DI equation for the gear as recited by claim 10 is not taught by prior art, such would not be a patentable difference since the high hardness property attributed to the equation is taught.

19. EP-723 teaches a case-hardened gear that closely meets the claim but is hardened by nitriding, carburizing and carbonitriding whereas present invention hardens by induction heating and quenching. Even though the prior art product is made by a different process, such would not be a patentable merit. Note that in a product-by-process claim, patentability is determined by the product per se and not its process of making. The burden falls to the Applicant to show that any process steps associated with the claimed product results in a materially different product from those of the prior

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art because there is nothing in the record before the Examiner to reasonably conclude that claimed product differs in kind from those obtained by the prior art.

20. Although EP-723 does not teach tempering after case hardening as recited by claim 1, such step would be obvious to incorporate since it is well known in the art and conventional practice to temper case-hardened steel gear to further strengthen and relieve stress as evident by the English abstracts of JP-736 or JP-726.

Allowable Subject Matter

21. Claims 17, 22, 24, and 25 to 29 are allowed.

22. Claim 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

23. The following is a statement of reasons for the indication of allowable subject matter: The method of producing a case hardened gear comprising the steps of subjecting gear to Cr concentration heat treatment step, case hardening treatment by induction heating to 900 to 1100°C within 10 seconds followed by rapid cooling, and tempering at 100 to 300°C, as recited by claims is not taught or fairly suggested by the art of record.

Conclusion

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah Yee whose telephone number is 571-272-1253. The examiner can normally be reached on monday-friday 6:00 am-2:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Deborah Yee/
Primary Examiner
Art Unit 1793

/DY/